DOCUMENT RESUME

ED 248 217 SP 025 093

AUTHOR Daniel, Arlie; And Others
TITLE Cognitive Style as a Predictor of Achievement: A Multivariate Analysis.
PUB DATE May 84
NOTE 31p.; Paper presented at the Annual Convention of the International Communication Association (San Francisco, CA, May 1984).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; *Cognitive Style; Concept Formation; *Field Dependence Independence; Higher Education; *Student Evaluation of Teacher Performance; Teacher Effectiveness; *Teacher Student Relationship; *Teaching Styles

ABSTRACT

The relationship between student achievement and student evaluation of instructors based on the match/mismatch of cognitive styles was examined. Students (N=161) and teachers (N=10) were administered the Group Embedded Figures Test during the semester. At the end of the course, teacher evaluations and students' scores were obtained and analyzed through a multivariate analysis of variance. Results indicate that the field independent students with field independent teachers received the highest grades, while field dependent students with field dependent teachers received the lowest grades. Field dependent teachers received their highest evaluations from field dependent students, while field independent teachers received their lowest ratings from them. Generally, field dependent teachers were evaluated higher by all students and field independent teachers were evaluated least favorably. (Author/JD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

COGNITIVE STYLE AS A PREDICTOR OF ACHIEVEMENT: A MULTIVARIATE ANALYSIS

Arlie Daniel
East Central University
Ada, OK

Cynthia Rasmussen
Illinois State University
Normal, IL

Jon Jackson
Southwest Missouri State University
Springfield, MO

Doug Brenner
Bellevue College
Bellevue, NE

A paper presented at the annual convention
of the
International Communication Association
San Francisco
May 1984

ED248217

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Arlie Daniel
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

SP 025 093

ABSTRACT

This paper examines the relationships between student achievement and student evaluations of instructors based on the match/mismatch of cognitive styles. Students and teachers were administered the Group Embedded Figures Test during the semester. At the end of the course, teacher evaluations and students scores were obtained and analyzed through a multivariat analysis of variance. Results indicate the Field Independent students with Field Independent teachers received the highest grades while Field Dependent students with Field Dependent teachers received the lowest grades. Field Dependent teachers recieved the highest evaluations from Field Dependent students while Field Independent teachers recieved the lowest ratings from them. Generally, Field Dependent teachers were evaluated higher by all students and Field Independent teachers were evaluated least favorably.

Cognitive Style as a Predictor of Achievement: A Multivariate Analysis

The procedure of translating raw sensory data i[illegible] meaningful experience has been referred to by Mortensen (1972, p. 69) as "information processing." The key assumption of information processing is that

> . . . the human organism is an integrated system of complex and interdependent functions designed to interpret events in ways that are consistent with its past experience and existing physical and psychological state (Mortensen, 1972, p. 70).

Additionally, in this process, the human organism has the capacity to generate and control the use of rules and strategies.

Countless aspects of information processing affect an individual's capacity to process information. Scholars assert (1) different people use various means of processing information in the same situation and (2) the same person processes information differently under varying situational conditions. Different cues signal different thought levels at varying times, resulting in different processing outcomes and distinctive patterns for each individual. Rhodes (1975) refers to the differences in the processing of the information as "cognitive style." Other references include such terms as "information processing" (Schroder, Driver, & Streufert, 1967; Suedfeld, Tomkins, & Tucker, 1969; Tagatz, Hess, Layman, & Garrison, 1971), "cognitive complexity" (Adams-Webber, 1969; Clark and Delia, 1977), Vannoy, 1967), "conceptual complexity: (Karlins, Coffman, Lamm, & Schroder, 1967), "cognitive integration" (Scott, 1974) and "in-

tegrative complexity" (Tuckman, 1966). All of these terms refer to a person's field dependence/independence or degree of abstractness/concreteness (Goodenough, 1976; Schroder, et al., 1967; Stone, 1979). As a consequence of the general use of the terms field dependence and field independence, throughout this paper we shall refer to cognitive style and field dependence/independence as described and used by Witkin and his associates (1975, 1976, 1977) in attempting to disembed simple figures from more complex backgrounds to determine field independence and degree of complexity.

The individualistic modes of cognitive style are revealed throughout perceptual and intellectual activities in a highly consistent and persuasive manner (Witkin, 1976). These manners differ along several dimensions. The basic tests to determine the major cognitive sytle of an individual include: the Rod and Frame Test, the Tilted Chair, and the Embedded Figures Test. The common denominator underlying the individual differences in these test tasks is:

> . . . the extent to which a person is able to deal with a part of a field separately from the field as a whole, or the extent to which he is able to disembed items from organized content (Witkin, 1976, pp. 41-2).

The results of these tests categorize an individual as either field dependent (FD) or field independent (FI).

Field dependent individuals tend to possess more of a "social orientation." They rely less on internal referents and more on

external referents, and as a result have difficulty in re-structuring information. Consequently, they have trouble separating embedded figures from a surrounding field or in correctly aligning a rod vertically in the Rod and Frame test. Field dependent persons differ from those with a field independent cognitive style in that they have a greater need for external structuring or guidance from others in requiring externally defined goals and reinforcement. Witkin, et al., (1977) conclude that:

> Field-dependent students may need more explicit instruction in problem-solving strategies or more exact definition of performance outcomes than field-independent students, who may even perform better when allowed to develop their own strategies (p. 25).

Research shows that field dependent people prefer involvment with others; they are attentive to social cues; and they are more interested in people rather than in abstract principles (Witkin, et al., 1979). Furthermore, field dependent individuals tend to be more socially dependent and rely upon external social frames of reference to define their attitudes. They also tend to be more influenced by authoritative opinion. For field dependent individuals, perception of stimuli is affected by the field in which they are situated.

Field independent individuals tend to perceive stimuli independent of the contexts in which they are embedded. Since field independent persons rely upon internal referents, they have the capacity to go beyond information in any given stimulus field and

to restructure that field (Witkin, et al., 1977). For this reason, they are able to separate embedded figures in a surrounding field or correctly make a rod vertical in the rod and frame test. More importantly, a person with a field independent style tends to be more self-reliant and thus tends to have a "non-social orientation." Such individuals prefer relatively impersonal situations and maintain greater psychological and personal space from others than do field dependent persons (Greene, 1976). This "non-social orientation" also reflects a greater concern for ideas and abstract skills.

People tend to be consistent in their styles over time, and thus field dependence/independence is related to a wide variety of an individual's behaviors. For example, field dependent persons are better at learning materials with social content (e.g., material involving people, interaction with their peers, and interaction with instructors) (Witkin, et al., 1977). In contrast, field independent persons do not attend as readily to material with social content. They tend to perform better in modularized instruction and under conditions of intrinsic motivation (Grippin, 1976). In addition, Greene's (1976) study suggests that field independent persons may not perform well when the material is social.

It should be noted that field dependent (FD) and field independent (FI) people differ primarily only in problems requiring disembedding a salient element from a context; they are not parti-

cularly differentin other sorts of problem-solving tasks such as verbal skills or standardized intelligence tests (Witkin, 1976). Essentially, the individual differences which exist between FD and FI people can be explained in terms of their organizing behaviors or "complexity." This includes, (a) the number of parts at work in the system, termed "differentiation" or "dimension;" and (b) the amount of inter-communication between parts, termed "integrative complexity" (Rhodes, 1975). Usually the FD person has difficulty integrating dissimilar situations and is referred to as "concrete." On the other hand, the FI person can readily integrate dissimilar situations and is referred to as "abstract."

These cognitive styles are continuously at work in any number of combinations in the educational system, and educators face the ensuing task of determining the effect different cognitive styles play in all aspects of education. Far too little is known about the match/mismatch relationship between student/teacher cognitive styles and the outcome of that relationship in the classroom. Cognitive style is a vital variable that can affect the educational process in several ways. Cognitive style affects students' academic choices and vocational preferences in such areas as which classes to take, careers to follow, etc. Cognitive style also affects the students' learning styles and the teachers' approaches to conducting class in terms of achievement (Witkin, 1977). A third area cognitive style affects is in regard to the process of student and teacher interaction in the

classroom (Witkin, 1976). These are important elements to consider when creating the most effective classroom climate for both teacher and student. The importance of these elements has not been adequately researched to determine the match/mismatch between student/teacher cognitive styles and the subsequent effects this relationship plays on student achievement and teacher evaluation. As Witkin, et al., (1977) note, research on field dependence/independence and its educational applications is still in its early stages. Indeed, a number of questions remain unanswered. For example, how does a student's cognitive style influence his or her perceptions of and processing of classroom information? How is this reflected in classroom achievement?

The majority of research in this area deals with elementary-aged students who have been found to be predominately field dependent. With increasing age (up to their teen years) there is a gradual reduction in field dependency. This reduction is attributed to an increasing ability of children to make decisions based on what they know as well as what they perceive instead of merely basing their judgments on perceptions (Fellows, 1968). Experience, then, becomes a mediating factor. Therefore, it will be important to determine whether college-aged students are affected by the same or similar growth patterns, or if Di Marco (1974, P. 207) was correct in concluding that "a student's attitude toward his/her teacher is related to the degree to which they share certain values."

Cawley, Miller, and Milligan (1976) found that people who score high FI prefer a more formal learning environment. People who score low FI prefer an informal learning environment. This study is of particular interest for two reasons: (1) it was conducted with adult learners, and (2) it showed the importance of providing the student with a pleasant learning environment. It seems that students do have preferences, and if these preferences are matched with those values of the teacher, then a more positive atmosphere may be created.

A study by Peterson, Marx, and Clark (1978) found that teachers' lesson plans are a direct result of their cognitive styles. Peterson, et al., used four tests to determine the cognitive styles of the teachers: (a) verbal ability, as measured by the Extended Range Vocabulary Test, (b) flexibility of closure, as measured by the Hidden Figures Test, (c) reasoning ability, as measured by the Necessary Arithmetic Operations test, and (d) conceptual level, as measured by the Paragraph Completion Test. After testing, the teachers were asked to prepare lesson plans which they later taught. It was found that the lesson plans were affected by the cognitive styles as well as the method of teaching and the familiarity of the teacher with the subject matter. For example, teachers who were FD tended to plan and teach "low order" subject matter, but were more productive and were more verbal. FI teachers tended to direct their attention more to the instructional process than to the learner;

they were also more abstract in their planning and teaching of material in that they went beyond the information given more than did FD teachers.

Witkin, et al., (1977) found that most individuals who choose to teach are field dependent--preferring to spend their time with others rather than alone. Differences which allow for field independent teachers can be attributed to speciality areas of teaching requiring less interaction with students. FD instructors prefer teaching situations which allow interaction with students while FI teachers favor impersonal situations and are oriented toward the more cognitive aspects of teaching (Witkin, 1975). Predictably, then, FD teachers would prefer the discussion method of instruction and would be more student-centered whild FI instuctors would favor the lecture or discovery approach to teaching and be more content oriented. Research does indicate that teachers in their choice of more or less FD/FI subject areas would do the best job in an area that lends itself to their specific cognitive style. This suggests that a student would do best in subjects oriented to his/her cognitive style, even where the teacher was matched to his/her cognitive style (Grieve and Davis, 1971). Grieve and Davis further showed that the amount of knowledge students acquire by different teaching methods is related to their cognitive styles.

Relationships between student achievement and student evaluation of instructors have been researched a number of times.

However, these relationships have not been thoroughly investigated by looking at cognitive styles as the predictors of certain specific outcomes. Packer and Bain (1978) studied the affects of cognitive style matching in 32 student/teacher pairs. They tested two cognitive style dimensions: serialism/holism and field dependence/independence. The FD/FI dimensions offer the greatest significance to this effort. Their test was administered to first year psychology students. The lesson evaluated was a 30-40 minute lecture. Dependent variables were: (a) student scores on two tests of the material taught, one immediately following and one a week after the teaching session, (b) teachers' and students' subjective evaluation of the ease of teaching or learning from their partners, and (c) teachers' written lesson plans, analyzed according to teaching strategy. The GEFT (Group Embedded Figures Test) was utilized to determine FD/FI. The topic presented was chosen to fulfill two criteria: (1) its unfamiliarity to the students, and (2) that is could be taught in a 30-40 minute session. Teaching methods were of two types: (1) formal and (2) student involvement.

The results showed a significant interaction between teacher's cognitive style and students' cognitive style. FI students performed significantly better than did FD students. For FD students, FD teachers were superior to FI teachers, and for FI students, FI teachers were superior.

Witkin, Moore, Goodenough, and Cox (1975) review several

studies of match/mismatch of cognitive styles of students and teachers. In one of the studies, Di Stefano (1970) asked students and teachers to evaluate each other. He found that those whose cognitive styles matched tended to evaluate each other positively while those who were mismatched tended to view each other negatively. In another study Witkin, et al. (1975) report confirmation of Di Stefano's findings when a special mini-course was created by James with three FD and three FI students per teacher. In this study extremely FD teachers gave higher grades to FI students. These grades were based only on classroom impressions, and reflect in large the interpersonal attraction of the teachers and students, or some characteristic not wholly cognitive.

Battle and Fabick (1975) investigated the validity of college students' evaluations and their instructors' competence. They exposed psychology students to a warm and entertaining instructor who presented a 30-minute lecture of information and an aloof, straightforward lecture-type instructor who presented a 30-minute lecture of accurate information. The entertaining lecturer was rated significantly more competent by the students. Naftulin, Ware, and Donnely (1973) found the same type of relationship in their investigations. The obvious question is what about the long haul, the duration of a semester? Will these perceptions remain over long periods of time? Kohlan (1973) showed

that student ratings in the second hour of class and the last hour of class were consistent. Thus, it appears that people are consistent in not only their cognitive styles, but also in how these factors affect their perceptions of others.

In another study, Witkin et al., (1975) used a four session mini-course and tested preferences of teaching strategies and learning styles for 14-15 year old students. In this study, the interpersonal attraction did not show the expected match/mismatch of cognitive style. While this does not disprove Di Stefano (1978) and Witkin et al., (1975), it does cast some doubt on the matter of interpersonal attraction as a variable in determining match/mismatch of cognitive styles. Witkin, et al., (1975) further suggest that a "possible basis for the greater interpersonal attraction observed between persons matched in cognitive style may lie in similarity in modes of communication."

If what Witkin, et al., (1975) report is true then the measure of importance in the classroom situation is not the cognitive style, per se, but rather the cognitive style combined with the mode of presentation of the instructor (e.g., lecture, discussion, etc.) and the match in cognitive style may produce significance in some cases, not in all cases, as teachers may vary their mode of presentation based on circumstances other than cognitive style. In some instances instructors may feel that they must go against their personal desires in order to adequately present a lesson or unit. That is, a teacher may lecture because

of content or because of a lack of skill in using another method, but cognitively prefer the latter method, hence the inconsistent results in previous studies.

On the one hand, greater interpersonal attraction between teachers and students match in cognitive styles possibly creates a classroom atmosphere conducive to learning. On the other hand, homogeneous classrooms may be ill-advised since viewpoints will be less diverse and the classroom less lively. Matching/mismatching shows varied results in terms of student acheivement. Research by Marton and "Saljo" (1976) shows that despite cognitive styles, preferences and matching, students adapted to their conception of what was required of them. This information would tend to contradict the research which calls for matching in order for higher student acheivement.

In another study, Bendig (1953) showed that students seemed to learn about the same regardless of the match/mismatch. The differences in student achievement were insignificant even though student ratings of instructors varied between class sections and instructors. It may well be that matching has little effect upon learning. Any discontent may be the result of personalities and emotions, not achievement. Granted people like pleasant circumstances in which to work, but going to the trouble of matching cognitive styles solely for higher achievement may be neither necessary nor worth the time because of the problems of validity and reliability in making the "match."

The questions of importance, then, become:

1. Can cognitive style be used as a predictor of achievement?
2. Can cognitive style be used as a predictor of teacher evaluations?
3. Are there any interaction effects among cognitive style, achievement, and teacher evaluation?

METHOD

The GEFT (Group Embedded Figures Test) was selected as the instrument to be used to determine field dependence/independence because of its wide acceptance (over 3,000 studies are cited by the 1979 Consulting Psychologists Press) and the fact that the instrument has a test-retest reliability coefficient of .905 (.89 for periods up to three years). In addition, the test is easy to administer (takes approximately 20 minutes), is easy to score, and requires no cumbersome equipment or paraphernalia. These were important considerations in selecting this measure.

The dependent variables in this study were speech grades and test grades in class plus the student's overall evaluation of the instructors. The last item was taken from a standard departmental teacher evaluation form completed at the end of the semester.

SUBJECTS

Subjects were 161 undergraduate students in 10 sections of a basic speech course at a large midwestern University whose participation was voluntary, but who received class time to com-

plete the GEFT and the teacher evaluation. However, because all subjects did not identify themselves on their evaluations of their instructor, only those 141 subjects who did are included in the study.

PROCEDURE

Teachers and students were administered the GEFT during a regular class period. Students and instructors were asked to release course grades and evaluations with the assurance that names would not be reported either in the research nor to the teacher on the outcome of the evaluation by the student. Only those students who signed release forms and those instructors who agreed to release their evaluations were included in the experiment.

RESULTS

A multivariate analysis of variance was computed on the two independent and two dependent variables, creating a 2 x 2 design. The two independent variables were EFT scores for students (EFTS) and EFT scores for teachers (EFTT). The two dependent measures were the test grades in the course and the speech grades in the course. Sample sizes, means, and standard deviations are reported in Table 1. Marginal means and cell sizes are reported in Table 2. A look at the error correlation matrix (Table 3) indicates that the correlation between the de-

pendent measures is .33, indicating that a multivariate analysis is appropriate.

The overall F for interaction was nonsignificant at $p<.8684$. However, the main effect for EFTS was significant at $p<.02$, and the main effect for EFTT approached significance at $p<.078$. The step-down F for test grades was also significant at $p<.008$. While the overall F was not significant for EFTT, the step-down F for test grades was also significant (see Table 5).

A separate two-way analysis of variance was computed using the EFT scores of the students and teachers as the independent variables and the students' evaluations of their teachers as the dependent variable. The reason for computing a separate analysis on this dependent variable is that the evaluation scores were student assigned while the test and speech grades were teacher assigned. Since there was a difference in the source of the data, there should subsequently be separate analysis.

Sample sizes, means, and standard deviations are reported in Table 6. Table 7 sumarizes the analysis of variance results. The design created by this analysis was a 2 x 2 two-way ANOVA. The results indicate that the two-way interaction was non-significant however, the main effects for teacher was significant. The main effects for students was not significant but the results approached significance ($p<.089$) and were in the right direction. Thus, it seems that FD teachers tend to be rated more favorable by students than FI teachers.

DISCUSSION

A median split was used to categorize students and teachers on the EFT. The split occurred at 13, which is approximately the same as Witkin reports in the test manual. The Witkin norm has the split at 13 also, but 13 is considered high for men and 12 is high for women. In the split here, the 13 score was low on a total group split. However, Witkin reports his 13 as a mean score, which is approximately the same for this group of subjects as was the combined mean (12.2). It seems then, that this population is appropriately "normal" in its split between FD and FI.

The major findings of this study are that there is a significant ($p<.023$) main effect for EFTS as a predictor of test grades and for EFTT as a predictor of teacher evaluations ($p<.028$). These findings are consistent with Witkin, et al's. (1975, 1976, 1977) findings that the EFT is a strong predictor of student achievement.

It is interesting to note that the test grades for FI students in classes with FI teachers were the highest and the grades were lowest for FD students in classes with FD teachers. Test grades for FD students with FI teachers and for FI students did not vary much, which may account for the non-significant interaction results but it does seem clear that the match/mismatch of students and teachers does make some difference for some students. While the results for speech grades are non-significant, they are somewhat consistent with the test grades results except that FI students,

regardless of instructor, received higher grades than did FD students. The real problem with achieving significance is the lack of variability in the speech grades (Table 1).

Teacher evaluations also were consistent with the results of previous studies. However, the results were the opposite of the grade results. The FD teacher with FD students received the best evaluations and the FI teacher with FD students received the lowest evaluations. This somewhat confirms Cawley, Miller and Milligan's (1976) study in that the learning environment seems to be more important than grades in determining the teacher's evaluation. It also confirms Di Stefano's (1960) study in as much as all students tended to rate the FD teacher higher than they did the FI teacher, with FD students evaluating FD teachers the most favorably and FI teachers the least favorably. The differences between FD and FI students showed little difference overall. The teacher's cognitive style, however, did make a significant difference.

Another interesting point in this study is that the best grades are consistently in the "hi" categories. That is, FI students have higher grades than do FD students. Higher grades are also noted with FI teachers. On the other hand, the best teacher evaluations come from FD students and are better for FD teachers. While this tends to confirm the results of Packer and Bain (1978), it does go beyond that point, and provides a point for future research. Is the relationship for teacher evaluations

consistent? And why are FD teachers rated more highly when students with FI teachers do better on tests?

These results further indicate that FD teachers are preferred not only in the immediate situation as Naftulin, et al., (1973) found, but also over an entire semester. Thus, the FD teacher is preferred not only for a thirty-minute lecture, but over an extended period of time. Possibly the interpersonal attraction lasts more than for a few minutes.

If grades reflect achievement, then these results would tend to disconfirm the conclusions of Bendig (1953) in that the multivariate results indicate that FI students get better grades (and some might argue, learn more) than do FD students. While the results are not statistically significant for speech grades, they are for test grades where the subjective evaluations of the teachers are much less evident.

CONCLUSION

This study attempted to discover if there was a relationship between the cognitive style of the teacher and the cognitive style of the student in determining the achievement level of students and their evaluations of their teachers. Significant main effects were found for both independent variables as predictors of test grades and for EFT scores as a predictor of teacher evaluations. FI students seem to perform better than do FD students, at least on tests, and FD teachers tend to receive better evaluations than

do FI teachers

These results are consistent with the major findings of other studies using the Embedded Figures Test as a determiner of field dependence/independence. They further extend the previous results in that they go beyond psychology and "younger" students in testing the relationships among cognitive style, acheivement, and teacher evaluation. While there was no significant interaction for cognitive style, achievement, and teacher evaluation there is still a need to further test the possible relationships.

Further research is still needed with the match/mismatch of cognitive style and evaluation to extend these results beyond the communication class. While the cognitive style has been studied quite extensively for students up to about 15, and produced rather consistent results, little has been done yet with college students and other adults. More studies dealing with cognitive style and match/mismatch are needed. In addition, the teachers' style of teaching needs to also become a major factor in the studies, as well as the knowledge of the teachers' preferred methods of teaching. Once we have determined these factors, we can proceed to the questions of placement of students and whether students and teachers should be matched or mismatched to enhance learning. In addition, we may want to begin looking at our teacher evaluations more carefully and to note that there are differences in the evluations <u>because</u> a teacher is field de-

pendent or independent, in addition to the fact that the person may be labeled a "good" or "bad" teacher by students.

TABLE 1. Sample sizes, Means, and Standard Deviations.

EFTT	EFTS	N	DEPENDENT MEASURES	
			Test Grades	Speech Grades
FI				
	FI	39	X = 7.08 s = 2.25	X = 8.54 s = 0.83
	FD	41	X = 5.62 s = 2.88	X = 8.29 s = 1.07
FD				
	FI	36	X = 5.92 s = 2.57	X = 8.54 s = 1.41
	FD	25	X = 4.74 s = 3.24	X = 8.17 s = 0.98
		141		

Table 2. Marginal means and cell sizes.

Factor 1: EFTS		
Level 1 (FI) n = 75	means:	Tgrades = 6.52 Speech grades = 8.54
Level 2 (FD) n = 60	means:	Tgrades = 5.29 speech grades = 8.24
Factor 2: EFTT		
Level 1 (FI) n = 80	means:	Tgrades = 6.33 Speech grades = 8.41
Level 2 (FD) n = 61	means:	Tgrades = 5.43 Speech grades = 8.39

Tgrades: 1 = low and 12 = high

Speech grades: 1 = low and 12 = high

Table 3. Error Correlation Matrix.

		grades	Speech grades
1.	Tgrades	1.000	
2.	Speech grades	0.333	1.000

Table 4. Intercorrelation Matrix.

		GM	EFTS	EFTT	Interaction
1.	GM	1.000			
2.	EFTS	-0.093	1.000		
3.	EFTT	-0.151	0.114	1.000	
4.	Interaction	-0.114	-0.151	-0.093	1.000

Table 5. Summary Table.

Source	F	P	df	TGrades	SGrades
EFTS	3.876	0.023*	2,136	7.251*	0.526
EFTT	2.598	0.078	2,136	4.983*	0.241
Interact	0.141	0.868	2,136	0.089	0.194
Within	mean square error		137	7.350	1.198

* $p<.05$

Table 6. Sample Sizes, Means, and Standard Deviations.

EFTS	EFTT 1(FD)	2(FI)	
(FD) 1	n=31 X=3.03	n=41 X=2.32	n=72 X=2.63 sd=1.51
(FI) 2	n=28 X=2.86	n=37 X=2.49	n=65 X=2.65 sd=1.39
	X=2.95 sd=1.41 n=59	X=2.40 sd=1.45 n=78	X=2.64 sd=1.45

* the evaluation scores ranged from 1=very poor to 5=very good

Table 7. Summary table.

Source	df	ss	ms	f
EFTS	1	0.015	0.015	0.007
EFTT	1	10.225	10.225	4.918*
Interaction	1	0.994	0.994	0.478
Residual	133	276.514	2.079	
Total	136	287.748	2.116	

* $p < .05$

REFERENCES

Adams-Weber, J. R. Cognitive complexity and sociality. British Journal of Social and Clinical Psychology, 1969, 8, 211-216.

Battle, J., and Fabick, S. Validity of college students' evaluations of instructors' competence. Psychological Reports, 1975, 37, 1112-1114.

Bendig, A. W. Student achievement in introductory psychology and student ratings of the competence and empathy of their instructors. Journal of Psychology, 1953, 36, 427-433.

Bledsoe, J. C. Insights into one's own teaching: Stability of students' evaluation across classes. Psychological Reports, 1978, 42, 1071-1074.

Cawley, R. W. V., Miller, S. A., & Milligan, J. N. Cognitive styles and the adult learner. Adult Education, 1976, 26(2), 101-116.

Clark, R. A., & Delia, J. G. Cognitive complexity, social perspective-taking, and functional persuasive skills in second-to-ninth-grade children. Human Communication Research, 1977, 3, 128-134.

Di Marco, N. Life style, learning structure, congruence and student attitudes. American Educational Research Journal, 1974, 11, 203-209.

Di Stefano, J. J. Interpersonal perceptions of field independent and field dependent teachers and students (Doctoral dissertation, Cornell University, 1969). Dissertation Abstracts International, 1970, 31, 463A-464A.

Fellows, B. The Discrimination Process and Development. London: Bergaman Press, 1968.

Goodenough, D. R. The role of individual differences in field dependence as a factor in learning and memory. Psychological Bulletin, 1976, 83, 675-694.

Greene, L. R. Effects of field dependence on affective relations and compliance in dyadic interactions. Journal of Personality and Social Psychology, 1976, 34, 569-577.

Greene, M. A. Client perceptions of the relationship as a function of worker-client cognitive styles (Doctoral dissertation, Columbia University, 1972). Dissertation Abstracts International, 1972, 33, 3030A-3031A.

Grieve, T. D., & Davis, J. K. The relationship of cognitive style and method of instruction to performance in ninth grade geography. Journal of Educational Research, 1971, 5(3), 137-141.

Grippin, P.C. The influence of cognitive style on achievement and study time in two instructional formats. Journal of Instructional Psychology, 1976, 3, 19-22.

Karlins, M., Coffman, T., Lamm, H., & Schroder, H. The effect of conceptual complexity on information search in a complex problem-solving task. Psychonomic Science, 1967, 7(4), 137-138.

Kohlan, R. G. Comparison of faculty evaluations early and late in the course. Journal of Higher Education, 1973, 44, 587-595.

Marton, F., & Säljö, R. On qualitative differences in learning. British Journal of Psychology, 1976, 46, 4-11, 115-127.

Mortensen, C. D. Communication: The Study of Human Interaction. New York: McGraw-Hill, 1972.

Naftulin, D. H., Ware, J. E., & Donnely, F. A. A paradigm of educational seduction. Journal of Medical Education, 1973, 48, 630-635.

Packer, J., & Bain, J. D. Cognitive style and teacher-student compatibility. Journal of Educational Psychology, 1978, 70, 864-871.

Peterson, P. L., Mary, R. W., & Clark, L. M. Teacher planning, teacher behavior, and student achievement. American Educational Research Journal, 1978, 15, 417-432.

Rhodes, S. C. An empirical analysis of the relationship between information processing and feedback utilization in dyadic communicative systems. Unpublished doctoral dissertation, The Pennsylvannia State University, 1975.

Schroder, H. M., Driver, M. J., & Streufert, S. Human Information Processing. New York: Holt, Rinehart, and Winston, Inc., 1967.

Scott, A. Varieties of cognitive integration. Journal of Personality and Social Psychology, 1974, 30, 563-578.

Stone, E. F. Field independence and perceptions of task characteristics. A laboratory investigation. Journal of Applied Psychology, 1979, 64, 305-310.

Suedfeld, P., Tomkins, S.S., & Tucker, W. H. On relations among perceptual and cognitive measures of information processing. Perception and Psychophysics, 1969, 6, 45-46.

Tagatz, G. E., Hess, L. R., Layman, J. A., & Garrison, D. Effects of ethnic background, response option, task complexity and sex on information processing in concept attainment. Journal of Experimental Education, 1971, 39, 69-72.

Tuckman, B. W. Integrative complexity: Its measurement and relation to creativity. Educational and Psychological Measurement, 1966, 26, 655-664.

Vannoy, J. S. Generality of cognitive complexity as a personality construct. Journal of Personality and Social Psychology, 1965, 2, 385-396.

Witkin, H. A. Cognitive style in academic performance and in teacher-student relations. In S. Messick (ed) Individuality in Learning: Implications of Cognitive Style and Creativity for Human Development. San Francisco: Jossey-Bass, 1976.

Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D. R., & Karp, S. A. Psychological Differentiation. Potomac, MD: Erlbaum, 1974.

Witkin, H. A., Goodenough, D. R., & Oltman, P. K. Psychological differentiation: Current Status. Journal of Personality and Social Psychology, 1979, 37, 1127-1145.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P.W. Field-dependent and field-independent cognitive styles and their educational implications. Princeton, NJ: Educational Testing Service Research Bulletin, 1975.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. Field dependent and field-independent cognitive styles and their educational implications. Review of Educational Research, 1977, 47, 1-64.